

WHAT IS CLAIMED IS:

1. A fluorescent intensity measuring method which measures the intensity of minute points which are arranged on a substrate having a substantially  
5 flat surface and include a fluorescent substance, comprising:

a first imaging step of emitting light with a wavelength with which the fluorescent substance can be excited and obtaining an image of each minute point  
10 including the fluorescent substance as a first image;

a second imaging step of obtaining an image of foreign matter adhering on the substrate as a second image by light with a wavelength which does not excite the fluorescent substance;

15 an extraction step of obtaining a binarized image by extracting a foreign matter area from the second image; and

a foreign matter elimination step of disabling an image at a part overlapping the foreign matter area in  
20 the first image with the binarized image being used as a mask.

2. A fluorescent intensity measuring method according to claim 1, further comprising an expansion step of expanding the foreign matter area of the  
25 binarized image by a determined quantity.

3. A fluorescent intensity measuring method according to claim 2, further comprising a

normalization step of normalizing the measured intensity of the minute point by using a reference area of the minute point.

4. A fluorescent intensity measuring method  
5 according to claim 3, further comprising a reliability judgment step of obtaining an area of each minute point after the foreign matter elimination step and judging the reliability of the measurement value by using a ratio of the obtained area and the reference area of  
10 the minute point.

5. A fluorescent intensity measuring method according to claim 4, further comprising a correction step of correcting the second image by using a reference image.

15 6. A fluorescent intensity measuring method according to claim 4, wherein the extraction step obtains the binarized image by using a differential image acquired from the second image.

7. A fluorescent intensity measuring method  
20 according to claim 6, wherein the extraction step determines a binarization level of the binarized image by using a frequency distribution of the differential signal corresponding to each pixel.

8. A fluorescent intensity measuring method  
25 according to claim 7, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

9. A fluorescent intensity measuring method according to claim 6, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

5        10. A fluorescent intensity measuring method according to claim 3, further comprising a correction step of correcting the second image by using a reference image.

10       11. A fluorescent intensity measuring method according to claim 3, wherein the extraction step obtains the binarized image by using a differential image acquired from the second image.

15       12. A fluorescent intensity measuring method according to claim 11, wherein the extraction step determines a binarization level of the binarized image by using a frequency distribution of the differential signal corresponding to each pixel.

20       13. A fluorescent intensity measuring method according to claim 12, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

25       14. A fluorescent intensity measuring method according to claim 11, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

15. A fluorescent intensity measuring method according to claim 2, further comprising a reliability

judgment step of obtaining an area of each minute point  
after the foreign matter elimination step and judging  
the reliability of the measurement value by using a  
ratio of the obtained area and the reference area of  
5 the minute point.

16. A fluorescent intensity measuring method  
according to claim 15, further comprising a correction  
step of correcting the second image by using a  
reference image.

10 17. A fluorescent intensity measuring method  
according to claim 15, wherein the extraction step  
obtains the binarized image by using a differential  
image acquired from the second image.

15 18. A fluorescent intensity measuring method  
according to claim 17, wherein the extraction step  
determines a binarization level of the binarized image  
by using a frequency distribution of the differential  
signal corresponding to each pixel.

20 19. A fluorescent intensity measuring method  
according to claim 18, wherein the differential signal  
is standardized with an intensity in a minute area  
corresponding to the differential signal.

25 20. A fluorescent intensity measuring method  
according to claim 17, wherein the differential signal  
is standardized with an intensity in a minute area  
corresponding to the differential signal.

21. A fluorescent intensity measuring method

according to claim 2, further comprising a correction  
step of correcting the second image by using a  
reference image.

22. A fluorescent intensity measuring method  
5 according to claim 2, wherein the extraction step  
obtains the binarized image by using a differential  
image acquired from the second image.

23. A fluorescent intensity measuring method  
according to claim 22, wherein the extraction step  
10 determines a binarization level of the binarized image  
by using a frequency distribution of the differential  
signal corresponding to each pixel.

24. A fluorescent intensity measuring method  
according to claim 23, wherein the differential signal  
15 is standardized with an intensity in a minute area  
corresponding to the differential signal.

25. A fluorescent intensity measuring method  
according to claim 22, wherein the differential signal  
is standardized with an intensity in a minute area  
20 corresponding to the differential signal.

26. A fluorescent intensity measuring method  
according to claim 1, further comprising a  
normalization step of normalizing the measured  
intensity of the minute point by using a reference area  
25 of the minute point.

27. A fluorescent intensity measuring method  
according to claim 26, further comprising a reliability

judgment step of obtaining an area of each minute point  
after the foreign matter elimination step and judging  
the reliability of the measurement value by using a  
ratio of the obtained area and the reference area of  
5 the minute point.

28. A fluorescent intensity measuring method  
according to claim 27, further comprising a correction  
step of correcting the second image by using a  
reference image.

10 29. A fluorescent intensity measuring method  
according to claim 27, wherein the extraction step  
obtains the binarized image by using a differential  
image acquired from the second image.

30. A fluorescent intensity measuring method  
15 according to claim 29, wherein the extraction step  
determines a binarization level of the binarized image  
by using a frequency distribution of the differential  
signal corresponding to each pixel.

31. A fluorescent intensity measuring method  
20 according to claim 30, wherein the differential signal  
is standardized with an intensity in a minute area  
corresponding to the differential signal.

32. A fluorescent intensity measuring method  
according to claim 29, wherein the differential signal  
25 is standardized with an intensity in a minute area  
corresponding to the differential signal.

33. A fluorescent intensity measuring method

according to claim 26, further comprising a correction  
step of correcting the second image by using a  
reference image.

34. A fluorescent intensity measuring method  
5 according to claim 26, wherein the extraction step  
obtains the binarized image by using a differential  
image acquired from the second image.

35. A fluorescent intensity measuring method  
according to claim 34, wherein the extraction step  
10 determines a binarization level of the binarized image  
by using a frequency distribution of the differential  
signal corresponding to each pixel.

36. A fluorescent intensity measuring method  
according to claim 35, wherein the differential signal  
15 is standardized with an intensity in a minute area  
corresponding to the differential signal.

37. A fluorescent intensity measuring method  
according to claim 34, wherein the differential signal  
is standardized with an intensity in a minute area  
20 corresponding to the differential signal.

38. A fluorescent intensity measuring method  
according to claim 1, further comprising a reliability  
judgment step of obtaining an area of each minute point  
after the foreign matter elimination step and judging  
25 the reliability of the measurement value by using a  
ratio of the obtained area and the reference area of  
the minute point.

39. A fluorescent intensity measuring method according to claim 38, further comprising a correction step of correcting the second image by using a reference image.

5        40. A fluorescent intensity measuring method according to claim 38, wherein the extraction step obtains the binarized image by using a differential image acquired from the second image.

10       41. A fluorescent intensity measuring method according to claim 40, wherein the extraction step determines a binarization level of the binarized image by using a frequency distribution of the differential signal corresponding to each pixel.

15       42. A fluorescent intensity measuring method according to claim 41, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

20       43. A fluorescent intensity measuring method according to claim 40, wherein the differential signal is standardized with an intensity in a minute area corresponding to the differential signal.

25       44. A fluorescent intensity measuring method according to claim 1, further comprising a correction step of correcting the second image by using a reference image.

45. A fluorescent intensity measuring method according to claim 1, wherein the extraction step



obtains the binarized image by using a differential image acquired from the second image.

46. A fluorescent intensity measuring method according to claim 45, wherein the extraction step  
5 determines a binarization level of the binarized image by using a frequency distribution of the differential signal corresponding to each pixel.

47. A fluorescent intensity measuring method according to claim 46, wherein the differential signal  
10 is standardized with an intensity in a minute area corresponding to the differential signal.

48. A fluorescent intensity measuring method according to claim 45, wherein the differential signal is standardized with an intensity in a minute area  
15 corresponding to the differential signal.

49. A fluorescent intensity measuring apparatus which measures the intensity of a fluorescent image obtained by irradiating minute points which are arranged on a substrate having a substantially flat  
20 surface and include a fluorescent substance with an excitation light, comprising:

a light source;

first wavelength selecting means for selecting a wavelength of the excitation light;

25 image forming means for forming an image of the fluorescent substance;

second wavelength selecting means for selecting

only a wavelength of a generated fluorescence;

photoelectric converting means for obtaining an image by scanning a fluorescent image;

storing means for storing the image; and

5 image processing means for performing:

processing to emit light with a wavelength which can excite the fluorescent substance in the light from the light source by controlling the first wavelength selecting means, to obtain an image of the minute point including the fluorescent substance as a first image by the photoelectric converting means by controlling the second wavelength selecting means, and to store the first image in the storing means;

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15 processing to emit light with a wavelength which does not excite the fluorescent substance in the light from the light source by controlling the first wavelength selecting means, to obtain an image of a foreign matter which has adhered to the substrate by the photoelectric converting means by controlling the second wavelength selecting means, and to store the second image in the storing means;

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processing to obtain a binarized image by extracting a foreign matter area from the second image stored in the storing means; and

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processing to disable an image at a part overlapping the foreign matter area in the first image

stored in the storing means with the binarized image  
being used as a mask.